S
Séles-Modoc
Badger Springs Unit

San Francisco,
California.

REPORT ON WESTERN PINE BEETLE SITUATION

and the

APPRAISAL OF THE TIMBER VALUES

in the

BADGER SPRINGS UNIT

MODOC NATIONAL FOREST

D-5.

Respectfully Submitted:

June 7, 1928.

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Appfoved: 6/27/28.

See Forester's letter 6/27/28
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APPRAISAL REPORT

INDEX

Introduction, ---------- Page 1

I. Location, ---------- 2

II. Topographical Conditions, ---------- 2

III. Silvical Conditions, ---------- 2

IV. Present Beetle Conditions, ---------- 3
Table No. 1-A, ---------- 5
Table No. 1-B, ---------- 6
Table No. 1-C, ---------- 6
Table No. 2, ---------- 8
Table No. 3, ---------- 9
Graphs, ---------- 11
Western Yellow pine losses and present stand, -- 14
1927 Losses, ---------- 15

V. Condition of Timber, ---------- 16

VI. Possibilities of Control, ---------- 16

VII. Proposed Methods of Control, ---------- 17

VIII. Proposed Plan of Operation, ---------- 18

IX. Appraisal of Insect Killed Timber, ---------- 20
Plant per Unit, ---------- 20
Investment, ---------- 20
Depreciation, ---------- 20
Logging Costs, ---------- 21
Selling Price, ---------- 21

X. Appraisal of Green Timber, ---------- 24
Operating Costs, ---------- 24
Estimates, ---------- 25
Average Selling Price, ---------- 25
Indicated Stumpage Prices, ---------- 27

RECOMMENDATIONS, ---------- 28
Sample Agreement, ---------- 29

APPRAISAL REPORT

INTRODUCTION:

The Modoc Lava Bed Unit includes all of the timber north of the Pitt River in the western portion of the Modoc National Forest, and a comparatively small area east of the Mayfield lava flow on the Shasta National Forest.

With two exceptions, the stand is practically pure western yellow pine. On the eastern slopes of Glass Mountain, sugar pine, incense cedar, and white fir are found, while on the eastern slopes of Happy Camp Mountain, some incense cedar and white fir are found.

The overmaturity of the western yellow pine and the dry climatic conditions apparently offer ideal conditions for the western pine beetle (Dendroctonus brevicomis) and the area has been under observation by the Bureau of Entomology since 1922. The reports by F. P. Keen, Associate Entomologist, show that the infestation declined from 1921 to 1923. During the dry winter of 1923-24 it started to increase very rapidly and has nearly doubled each succeeding year. Mr. Keen estimates that the kill until 1925 was about offset by the growth, but the alarming increases in 1926 and 1927 made both the government and the private owners realize that some means of control should be undertaken. The 1927 report estimates that the beetles in the Glass Mountain unit, after killing 20% of the stand, have passed the peak and are on a decline. The government owns a small amount of timber along the edges of the infested portion of this unit, the remaining ownership being about equally divided between the Long-Bell Lumber Company and the Pickering Lumber Company. The Long-Bell Lumber Company, with a plant at Weed, is pushing its railroad into this area, with the intention of logging their timber as soon as possible. The Pickering Lumber Company have made no statement of their plans for this Unit.

Keen also believes that the Happy Camp Unit west of Happy Camp Mountain has passed the peak of infestation, altho there probably will be considerable further loss in this region. The Red River Lumber Company owns the majority of the timber in this area and has made no statement of plans for control.

It is the Badger Springs Unit which shows the alarming increase of infestation during 1927. The check plot in Section 16 of the government T. 44 N., R. 8 E., shows an increase from 3% kill in 1926 to 12% kill in 1927. Most of the private timber in the Badger Springs and Pitt River Units is owned by the Pickering Lumber Company. This Company is naturally very much perturbed by the losses reported in Keen's 1927 report and have approached the Forest Service with a suggestion for possible control of the beetles on both its holdings and the government lands within these two units.

Mr. Pickering has been planning the construction of a band mill at Alturas for the manufacture of the timber from his holdings in this region. However, due to the flooded lumber market and the unsettled railroad situation, he feels that the time is not right for the construction of such a plant. The of-

ficers of the company have stated that it might be possible to start immediate control by the operation of portable mills until it is feasible to start the larger mill, provided the Forest Service will advertise all of the available government timber. Mr. Pickering undoubtedly thinks that the possible loss due to operating beetle killed timber would be offset by the saving in his own and government stumpage by control, if he is assured of the government stumpage at non-competative rates.

As the heaviest infestation is centered in the government owned T. 44 N., R. 8 E., the Forest Service is vitally interested in any possibilities of control. This report is the result of an examination of the area made in April by the writers, with the assistance of Associate Entomologist F. P. Keen, Junior Forester R. M. Riley, and Mr. Garrett of the Pickering Lumber Company.

I. LOCATION:

The Badger Springs and Pitt River Units include that portion of the Modoc Lava Bed Working Circle lying north of the Pitt River and to the east of Happy Camp Mountain, and the unmerchantable lava flats south of Timber Mountain. To the north and east, the area is bounded by the open lava flats. The south boundary is the open bitter-brush slopes of the Pitt River. The northern portion of the west boundary is determined by the scattered, unmerchantable stands of government timber on the central lava beds, while the rest of the western boundary is determined by land ownership and the crest of Happy Camp Mountain.

II. TOPOGRAPHICAL CONDITIONS:

The timber occurs on a practically flat plateau from which the barren slopes drop sharply to the south and southeast into the Pitt River and Black's Canyon. In the heavier timbered area of the Badger Springs Unit, the topography is broken by long, rolling slopes which are ideal for tractor logging. The long, gently sloping draws, the loose soil, and the absence of rock outcrops will make railroad construction simple.

The large open flats in the center of the area, and the smaller lava and bitter-brush flats in the timber region become very wet and soft in the winter and spring. However, most of these flats can be avoided with the railroad.

III. SILVICAL CONDITIONS:

On the east slopes of Happy Camp Mountain, a small amount of both white fir, and incense cedar, is found in mixture with the western yellow pine. Around the southeast corner of T. 44 N., R. 8 E., a small amount of cedar is found. The remainder of the area is a pure stand of western yellow pine. The majority of the timber is overmature with an understory of small, thrifty material. The timber is generally in groups with a fair amount of reproduction in the openings.

IV. PRESENT BEETLE CONDITIONS:

Owing to the easy operating conditions, the examination was mainly concerned with the collection of data to determine the present status of the beetle infestation and the quality of the timber.

Approximately 36 miles of 1 chain strips (286 acres) were run in various locations within both the Pickering and the government holdings, as shown on the map. On these strips the timber was log graded and tallied by Dunning's tree classes into five condition groups. These condition groups were, (1) green timber cut, (2) green timber left, (3) 1927 winter killed from which the beetles are about to emerge, (4) 1927 summer killed, from which the beetles emerged last fall, and (5) the older kills, which were represented by the snags. From the condition of these older snags it was estimated that most of them were killed between 1920 and 1926; certainly, they had all been killed after Goldsmith's cruise in 1914 and 1915.

When tallying the leave trees on government lands an attempt was made to leave the area in the best possible condition by removing all the slow growing, beetle hazard trees, and leaving all of the thrifty material. Probably it would be impossible to induce the Pickering Lumber Company to go to the expense of marking their own timber or logging the very small overmature trees. However, they might consider a diameter limit for logging. The leave on Pickering lands has been tallied on the basis of leaving all of the Class #1 trees, some of which are as high as 28" D.B.H., and all of the trees 18" D.B.H. or under. The tally resulted in about a 10% leave on government lands, with somewhat less on the Pickering lands. However, it is thought advisable to mark heavily under these conditions and leave only thrifty trees which have a good chance of repulsing future beetle attacks.

A study of the data indicates that the heavy infestation follows closely Keen's outline of the area that was over 8% killed in 1927. All of the strips on government lands fell within this area. Part of the strips on the Pickering lands were within this area, while part of them were in the area of lighter infestation. The data has been worked up on an acreage basis and divided into three groups, the results being used to estimate the loss and to correct the cruises for the areas.

Altho the strips, upon which these data are based, represent only a small percentage of the area involved, we feel that the data is representative and dependable. From a complete tree count on 320 acres in the W/2 of Section 16, T. 44 N., R. 8 E., Keen estimates that 850 trees, containing 438 M feet, 12% of the stand, were killed in the half section during 1927. From the strip data on 17 acres in the same section the estimate is 1730 trees, containing 830 M feet, 13.5% of the stand, for the section.

For the 18 sections in T. 44 N., R. 8 E., in which strips were run, the present stand is estimated to be as follows:

Green timber to cut, ----------	113,600 M feet
Green timber to leave, ----------	12,500 M Feet
Timber lost in 1927, ----------	16,100 M Feet
Timber lost prior to 1927, -------	18,800 M Feet
Original stand prior to 1920, ----	161,000 M Feet,

Goldsmith's 1914 cruise estimated these same sections at 156,283 M feet - a check of 3.2%.

The following tables represent the conditions actually found on the strip, together with the estimate of the 1927 loss per acre, based upon comparison of strip conditions with those on either side.

TABLE #1-A

PRESENT CONDITION OF TIMBER ON 143.6 ACRES OF STRIP IN GOVERNMENT LAND

STAND PER ACRE

SEC.TWN.RNG.	AREA OF STRIP	CUT Vol. Ft.	CUT No.of Trees	LEAVE Vol. Ft.	LEAVE No.of Trees	1927 W Vol. Ft.	1927 W No.of Trees	1927 S Vol. Ft.	1927 S No.of Trees	1920-1926 Vol. Ft.	1920-1926 No.of Trees	TOTAL Vol. Ft.	TOTAL No.of Trees	Estimated 1927 Kill Vol.Ft.	Estimated 1927 Kill No.Trees
2--44N, 8E,	11.3	6245	4.69	1233	4.87	257	.27	-	-	1575	1.24	9310	11.07	500	.6
10 " "	11.3	6957	8.76	684	5.40	934	.80	351	.35	1576	1.24	10502	16.55	1300	1.2
15 " "	8.0	7515	8.00	924	4.13	1027	.75	974	1.38	2001	3.25	12441	17.51	2000	2.2
16 " "	17.0	8839	9.29	723	4.94	672	1.82	608	.88	1435	2.29	12347	19.22	1300	2.7
18 " "	5.6	6937	9.11	1100	6.43	525	.71	-	-	1100	1.07	9662	17.32	800	.8
19 " "	5.6	7995	9.46	1248	7.14	1075	.89	-	-	1711	1.61	12029	19.10	1100	.9
20 " "	5.6	9743	12.50	896	7.32	1670	3.04	721	1.25	3625	3.57	16655	27.68	2100	4.0
23 " "	8.0	3016	3.13	679	4.00	898	1.38	692	.75	1111	1.12	6396	10.38	1500	2.2
24 " "	8.0	13375	14.25	1150	6.75	-	-	519	.88	719	.87	15763	22.75	800	1.1
25 " "	8.0	15306	17.87	533	4.00	146	.38	433	.50	1631	1.50	18049	24.25	800	1.1
28 " "	5.6	6930	4.75	693	2.00	-	-	309	.75	1077	.38	9009	7.88	1000	1.5
29 " "	5.6	10534	8.13	441	3.25	1079	.88	-	-	252	.38	12306	12.64	1300	1.5
31 " "	4.0	15762	12.75	1880	6.75	873	1.00	2478	2.50	2998	3.25	23991	26.25	3300	3.5
32 " "	8.0	13873	9.00	2160	7.88	291	.50	1099	1.13	1941	1.87	19364	20.38	1600	2.0
33 " "	8.0	7763	6.00	1458	4.50	698	.88	348	.13	783	.62	11050	12.13	1200	1.2
34 " "	8.0	11375	11.63	1565	7.50	1113	2.13	244	1.00	809	1.38	15106	23.64	1300	2.5
35 " "	8.0	10823	10.38	1094	7.88	454	1.00	851	1.00	2671	2.75	15893	23.01	1300	2.0
36 " "	8.0	13980	17.13	1176	7.38	1078	1.38	284	.38	2750	3.00	19268	29.27	1500	2.0
AVERAGE:	143.6	9865	9.87	1085	5.70	703	1.02	517	.69	1630	1.75	13800	19.03	1400	1.8

TABLES #1-B & #1-C

PRESENT CONDITION OF TIMBER ON PICKERING LANDS

STAND PER ACRE

LOCATION SEC.TWN.RNG.	AREA OF STRIP	CUT Vol. Ft.	CUT No.of Trees	LEAVE Vol. Ft.	LEAVE No.of Trees	1927 W Vol. Ft.	1927 W No.of Trees	1927 S Vol. Ft.	1927 S No.of Trees	1920-1926 Vol. Ft.	1920-1926 No.of Trees	TOTAL Vol. Ft.	TOTAL No.of Trees	Estimated 1927 Kill Vol.Ft.	Estimated 1927 Kill No.Trees
TABLE #1-B:						AREA NO. 1 - HEAVY INFESTATION									
4 43N 8E.	8.0	11321	8.12	921	5.25	746	.75	472	.37	1516	1.37	14976	15.86	1200	1.1
9 " "	8.0	9959	8.12	969	4.37	681	.75	1814	2.13	2231	2.13	15654	17.50	2400	2.9
5 43N 9E.	5.4	14570	17.22	1067	11.30	1306	2.22	-	-	1935	3.33	18878	34.07	1500	2.5
12 43N 8E.	11.0	11244	12.64	911	8.64	1526	1.64	1301	1.55	2729	3.00	17710	27.47	2400	3.0
1&6 " 7 & 8.	7.7	11173	12.34	374	4.16	1678	2.21	157	.39	2030	3.38	15412	22.48	1800	2.6
12&7" 7 & 8.	8.0	6164	7.12	500	4.88	392	.87	-	-	1301	1.00	8357	13.87	900	1.4
Average:	48.1	10560	10.69	785	6.32	1067	1.37	703	.83	2006	2.35	15121	21.56	1700	2.2
TABLE #1-C:						AREA NO.2 - LIGHTER INFESTATION									
16-T43N 8E.	8.0	5241	3.76	1199	4.87	221	.13	94	.37	1169	1.12	7924	10.25	300	.5
21 " "	6.0	12487	10.83	243	3.17	610	.50	-	-	3857	3.33	17197	17.83	600	.5
33-T44N 9E.	11.3	13593	11.77	676	6.46	249	.71	696	1.06	934	.71	16148	20.71	900	1.7
29 " "	11.3	11440	11.50	847	8.58	133	.44	320	.18	1903	1.68	14643	22.38	400	.6
7-T43N 9E.	5.2	15162	11.92	804	7.31	271	.19	8	.19	3029	4.42	19274	24.03	300	.4
6 " "	5.6	8570	11.07	2616	16.07	-	-	-	-	2418	2.86	13604	30.00	1000	1.0
12 T43N 7E.	11.3	13714	11.95	660	6.64	-	-	-	-	1115	1.33	15489	19.92	700	.8
2 " "	9.6	14035	11.04	892	6.87	641	.42	251	.42	873	1.15	16692	19.90	800	.8
3 & 10, "	2.2	5873	5.91	682	4.56	-	-	-	-	641	.45	7196	10.92	300	.2
4 & 9, "	8.0	16532	14.00	419	4.62	336	.13	-	-	657	1.25	17944	20.00	400	.2
5 & 8, "	8.0	8619	10.12	418	4.88	251	.13	341	.37	1591	1.50	11213	17.00	600	.5
6 & 7, "	8.0	8896	9.38	394	4.26	97	.37	545	.87	1157	2.12	11089	17.00	500	.7
Average:	94.5	11657	10.62	787	6.53	241	.28	230	.34	1518	1.70	14433	19.47	570	.7

The last columns of the tables give a very good indication of the locations of heavy infestation as found during the examination. The column "1927-W" will show the areas of heavy winter kill from which the beetles will emerge this summer. A comparison with the column "1927-S" may give an indication of whether the infestation is increasing or decreasing, depending upon the ratio of winter and summer loss. However, this check is not absolute, as it is possible the narrow strips do not show a true relation between the winter and summer losses as the losses might not be represented by the same broods.

A study of these tables will be very helpful in planning the areas for concentrated control.

We feel that the high percentage of winter trees within the heavily infested area gives a pretty good indication that the infestation is still on the increase and that, unless unforeseen conditions arise, 1928 will be another year of very serious loss with probably an enlargement of the heavy infestation.

A study of the strips run in Sections 23 and 24, T. 44 N., R. 8 E., will give an idea of the extent to which the losses may go if the infestation is not checked. These two sections were apparently very similar in soil, topography, and timber stand at one time. Section 23 was very heavily attacked from 15 to 25 years ago, as evidenced by the many down snags. The infestation has continued with a loss of 1.1 trees per acre from 1920 to 1926, and 2.2 trees per acre in 1927, with an indication that it is still on the increase. The stand has been decreased from 16,000 feet per acre, found on the adjoining section 24, to 3,700 feet per acre, a nearly unmerchantable stand. The possibilities of such losses should demand control of some sort even at a considerable expense.

The same data has been arranged and presented in the following two tables on a percentage basis:

TABLE #2

PERCENTAGE OF EACH TREE CLASS FOUND IN THE VARIOUS CONDITION GROUPS

ITEM	BY VOLUME Tree Classes #1	#2	#3	#4	#5	#6	#7	AVG.	BY NUMBER OF TREES Tree Classes #1	#2	#3	#4	#5	#6	#7	AVG.
GOVERNMENT - HEAVY INFESTATION																
Cut	0.0	13.6	29.6	76.4	77.9	40.0	73.9	71.5	0.0	8.5	20.1	73.2	77.9	19.8	51.9	51.9
Leave	95.6	74.4	63.8	.9	0.0	40.0	4.3	7.8	95.5	79.1	73.4	1.9	0.0	58.0	6.2	29.9
1927-W	0.0	4.5	3.3	8.3	4.9	0.0	4.3	5.1	1.1	4.8	2.9	8.7	5.4	8.7	5.1	5.4
1927-S	2.2	3.0	1.1	6.1	3.7	0.0	4.4	3.8	1.7	2.8	1.4	6.2	4.0	1.2	2.2	3.6
1920-26	2.2	4.5	2.2	8.3	13.5	20.0	13.1	11.8	1.7	4.8	2.2	10.0	12.7	12.3	14.0	9.2
Total:	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100	100.0	100.0	100.0	100.0	100.0	100.0
PICKERING - AREA #1 - HEAVY INFESTATION																
Cut	0.0	32.4	75.0	69.7	73.6	0.0	35.1	69.7	0.0	14.9	74.2	63.3	72.6	0.0	23.2	49.5
Leave	99.8	64.9	18.8	3.4	0.0	90.9	26.3	5.2	99.1	80.7	16.1	9.7	0.0	88.5	40.3	29.3
1927-W	0.0	0.0	6.2	11.2	7.0	0.0	5.3	7.1	0.0	.7	9.7	10.7	7.8	0.0	7.3	6.4
1927-S	0.0	0.0	0.0	5.6	4.8	0.0	7.0	4.7	0.0	0.0	0.0	4.6	5.8	0.0	6.1	3.9
1920-26	0.2	2.7	0.0	10.1	14.6	9.1	26.3	13.3	0.9	3.7	0.0	11.7	13.8	11.5	23.2	10.9
Total:	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PICKERING - AREA #2 - LIGHTER INFESTATION																
Cut	0.0	26.1	74.6	87.6	84.4	0.0	55.1	80.7	0.0	10.3	68.7	78.0	83.1	0.0	28.9	54.6
Leave	98.0	69.1	23.8	3.2	.1	77.2	30.1	5.5	97.8	82.7	28.3	11.0	.1	84.0	52.1	33.5
1927-W	1.3	.8	1.6	1.3	1.8	2.2	0.0	1.7	.9	1.0	3.0	1.6	1.8	3.2	0.0	1.5
1927-S	.1	.3	0.0	2.0	1.7	3.9	1.3	1.6	.4	.7	0.0	2.3	2.4	6.4	1.7	1.7
1920-26	.6	3.7	0.0	5.9	12.0	16.7	13.5	10.5	.9	5.3	0.0	7.1	12.6	6.4	17.3	8.7
Total:	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
TOTAL OF ALL STRIPS																
Cut	0.0	20.2	46.4	79.0	79.4	22.0	53.6	74.3	0.0	10.0	40.9	72.8	78.9	11.6	48.0	52.4
Leave	97.2	71.2	48.3	2.1	0.0	63.9	15.9	6.6	97.1	80.6	53.2	6.2	0.0	69.5	28.1	30.9
1927-W	.5	2.8	3.2	6.5	4.2	2.9	2.7	4.3	.8	2.9	3.8	6.9	4.6	5.8	3.9	4.3
1927-S	1.0	1.8	.7	4.6	3.2	1.1	3.0	3.2	.9	1.7	.8	4.7	3.7	2.2	2.9	3.0
1920-26	1.3	4.0	1.4	7.8	13.2	10.1	14.8	11.6	1.2	4.8	1.3	9.4	12.8	10.9	17.1	9.4
Total:	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

TABLE #3

PERCENTAGES OF EACH CONDITION GROUP FOUND IN THE VARIOUS TREE CLASSES

ITEM	BY VOLUME Tree Classes #1	#2	#3	#4	#5	#6	#7	TOTAL	BY NUMBER OF TREES Tree Classes #1	#2	#3	#4	#5	#6	#7	TOTAL
GOVERNMENT - HEAVY INFESTATION - AREA #1																
Cut	0.0	0.6	1.9	12.4	83.8	0.1	1.2	100.0	0.0	2.7	2.0	26.6	58.6	1.1	9.0	100.0
Leave	27.8	31.6	37.4	1.3	0.0	1.3	0.6	100.0	34.9	44.3	12.5	1.2	0.0	5.8	1.3	100.0
1927-W	0.0	3.0	3.0	18.8	74.2	0.0	1.0	100.0	2.0	15.0	2.7	30.6	38.8	4.8	6.1	100.0
1927-S	1.3	2.6	1.3	18.4	75.1	0.0	1.3	100.0	5.0	13.1	2.0	32.4	42.5	1.0	4.0	100.0
1920-26	.4	1.3	.9	8.1	87.6	0.4	1.3	100.0	2.0	8.7	1.2	20.7	53.5	4.0	9.9	100.0
Aver.	2.3	3.3	4.6	11.6	76.7	0.3	1.2	100.0	10.9	16.8	5.1	19.0	38.7	3.0	6.5	100.0
PICKERING - HEAVY INFESTATION - AREA #1																
Cut	0.0	1.3	2.4	12.1	83.4	0.0	0.8	100.0	0.0	3.9	4.5	24.1	63.8	0.0	3.7	100.0
Leave	39.4	31.6	7.9	7.9	0.0	5.3	7.9	100.0	38.2	35.5	1.6	6.3	0.0	7.6	10.8	100.0
1927-W	0.0	0.0	1.9	19.4	77.3	0.0	1.2	100.0	0.0	1.5	4.5	31.8	53.1	0.0	9.1	100.0
1927-S	0.0	0.0	0.0	14.8	82.8	0.0	2.4	100.0	0.0	0.0	0.0	22.5	65.0	0.0	12.5	100.0
1920-26	0.0	0.5	0.0	9.4	86.8	0.2	3.1	100.0	0.9	4.4	0.0	20.4	54.6	2.7	16.8	100.0
Aver.	2.1	2.5	2.2	12.2	79.1	0.3	1.6	100.00	11.3	12.8	3.0	19.0	43.5	2.5	7.9	100.0
PICKERING - LIGHTER INFESTATION - AREA #2																
Cut	0.0	0.8	2.6	12.8	83.0	0.0	0.8	100.0	0.0	3.1	4.6	24.1	64.7	0.0	3.4	100.0
Leave	39.9	32.8	12.1	6.9	0.1	1.9	6.3	100.0	36.5	40.3	3.1	5.5	0.2	4.2	10.2	100.0
1927-W	1.8	1.3	2.6	9.2	84.9	0.2	0.0	100.0	7.4	11.1	7.4	18.6	51.8	3.7	0.0	100.0
1927-S	0.2	0.5	0.0	14.7	83.4	0.3	0.9	100.0	3.1	6.3	0.0	21.9	56.1	6.3	6.3	100.0
1920-26	0.1	0.9	0.0	6.6	90.7	0.2	1.5	100.0	1.2	9.9	0.0	13.7	60.9	1.2	13.1	100.0
Aver.	2.2	2.6	2.8	11.8	79.4	0.1	1.1	100.0	12.5	16.3	3.6	16.9	42.4	1.7	6.6	100.0
TOTAL OF ALL STRIPS																
Cut	0.0	0.8	2.2	12.5	83.6	0.0	0.9	100.00	0.0	3.0	3.3	25.4	61.6	.5	6.2	100.0
Leave	32.7	31.9	26.3	3.8	0.0	2.1	3.2	100.0	36.1	41.4	7.2	3.6	0.0	5.5	6.2	100.0
1927-W	.2	1.9	2.6	17.7	76.6	.1	.8	100.0	2.1	10.8	3.8	29.6	44.2	3.3	6.2	100.0
1927-S	.7	1.6	.8	16.8	78.7	.1	1.3	100.0	3.5	8.8	1.2	28.1	50.2	1.8	6.4	100.0
1920-26	.2	1.0	.4	7.8	88.7	.2	1.7	100.0	1.5	8.2	.6	18.4	56.0	2.9	12.4	100.0
Aver.	2.2	2.9	3.6	11.8	78.1	.2	1.2	100.0	11.5	15.9	4.2	18.3	40.9	2.4	6.8	100.0

Table #2 indicates the percentage on a 1920 stand basis of each tree class found in each of the various condition groups resulting from the tally of the strips.

Table #3 indicates the percentage on a 1920 stand basis of each condition group found in each of the various tree classes resulting from the tally of the strips.

In Table #2 the figures under the "average" columns will show the loss by volume and number of trees since 1920.

A comparison of the 1927 winter and summer loss for the heavily infested area indicates the same thing as the preceding Table #1 of volume per acre; that is, the winter loss made up about 60% of the 1927 loss and the infestation is, at the best, not lessening.

In the lighter infested area the 1927 winter loss is about 50% of a much lighter 1927 loss and might be construed to mean that the infestation is not only lighter but is, perhaps, decreasing. However, when we consider that the loss is practically as heavy from 1920 to 1926 for the area of lighter infestation as it is for the area of the heavier, we believe that the lower loss in 1927 is because the epidemic conditions have not yet extended to this area. The stand per acre from the preceding table (not) is slightly higher for the lighter infested area and the distribution of tree classes (table #3) is about the same. This, we believe, indicates that the present area of light infestation presents nearly ideal conditions for beetle work and that unless the present epidemic is controlled it will rapidly extend into this area.

As far as present beetle population and material for attack are concerned it appears that there are no reasons why the epidemic should not continue until the entire area is covered. However, we found smaller areas of epidemic condition in the past, as represented by down trees where some unknown conditions halted the epidemic when the timber stands adjoining were apparently just as susceptible to attack. With epidemic conditions over such a large area, even tho these unknown conditions should succeed in halting the attack, it would undoubtedly be a gradual decline and would result in an enormous loss before normal conditions were reached.

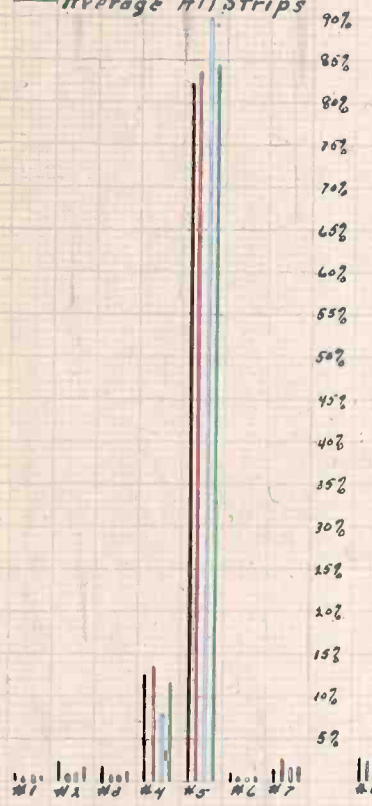
In order to present the combined data in the tables, a plate of graphs has been prepared:

C. W. Webb, Sta. J, New York, N. Y.

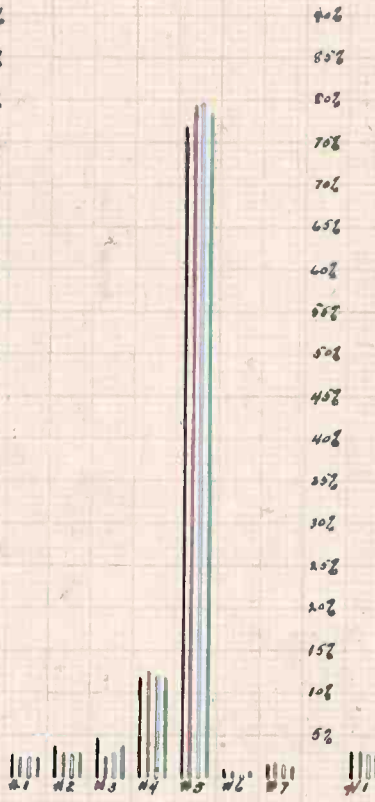
130

Percentage by Volume of Kill Since 1920 in Each Tree Class

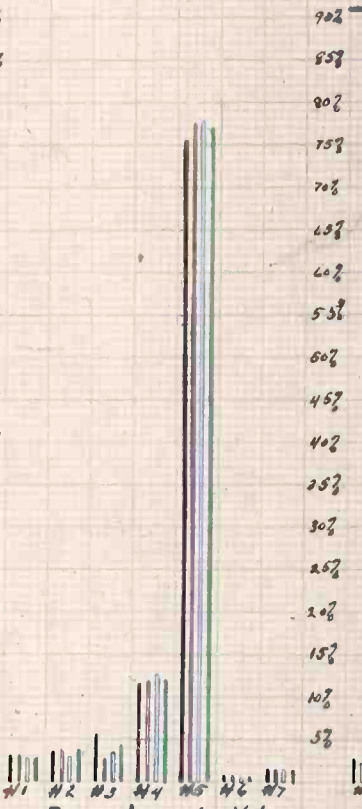
Gov't-Heavy Infestation
Private- " "
Private-Lighter " "
Average All Strips



Percentage by Volume of 1920 Stand in Each Tree Class

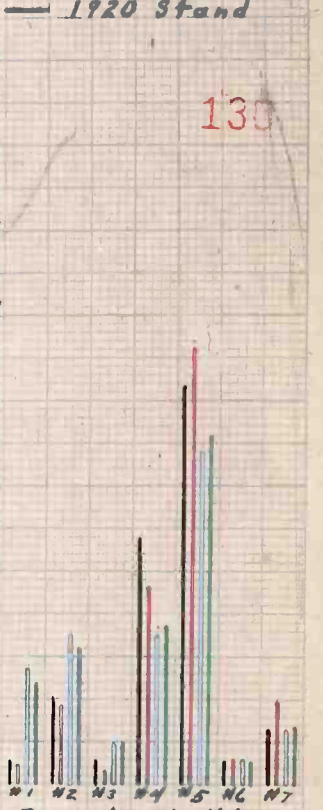


Percentage by Volume of Present Stand in Each Tree Class



Percentage by Number of Trees in Each Tree Class - Average

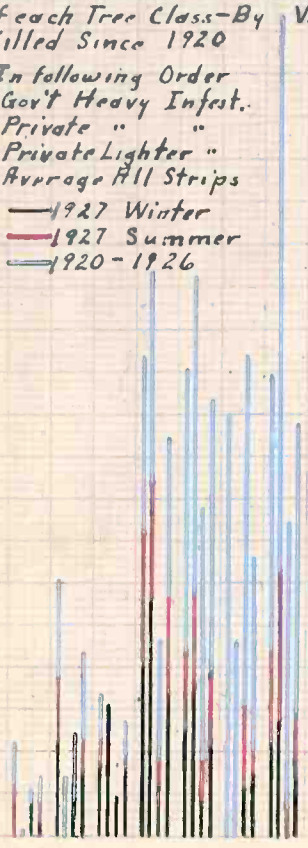
1927 Kill
1920-27 Kill
Present Stand
1920 Stand



Accumulative Percentages of each Tree Class - By Killed Since 1920

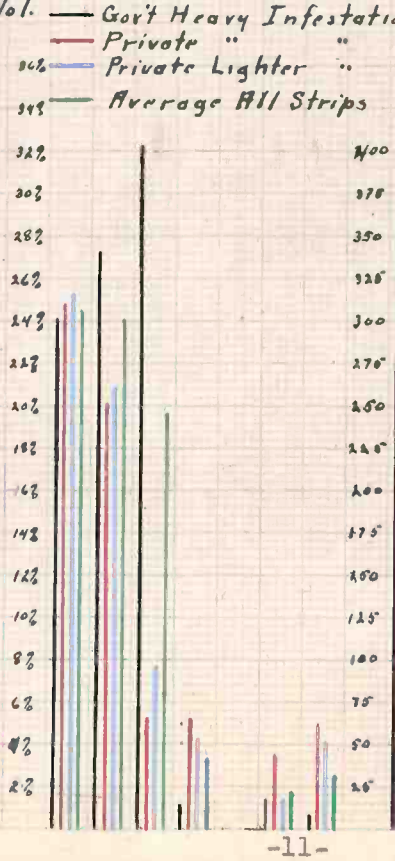
In following Order
Gov't Heavy Infest.
Private " "
Private Lighter "
Average All Strips

1927 Winter
1927 Summer
1920-1926

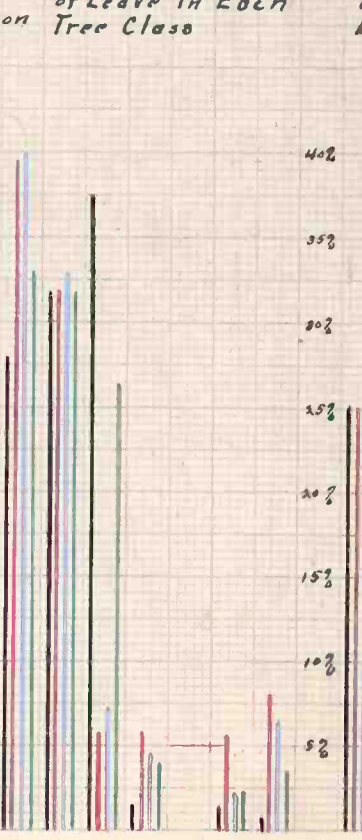


Vol. Board ft Left Per Acre

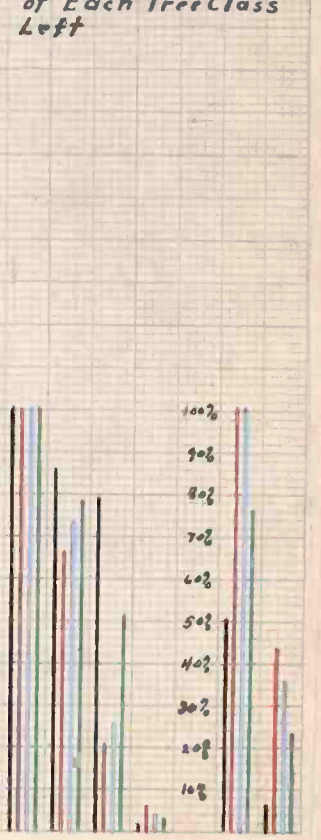
Gov't Heavy Infestation
Private " "
Private Lighter "
Average All Strips



Percentage by Volume of Leave in Each Tree Class



Percentage by Volume of Each Tree Class Left



Graph #1 shows the percentage by volume of the loss since 1920 that occurred in each tree class, and clearly indicates that practically all of the loss (96%) occurs in Classes #4 and #5. Comparing Graph #1 with Graph #2, which shows the percentage of the 1920 stand which was found in each tree class, it is seen that Classes #1, #2 and #3 are attacked in a smaller proportion than they occur in the stand, #4 and #6 in about the same ratio, and #5 and #7 somewhat heavier than they occur in the stand.

Comparison of Graphs #2 and #3, the 1920 and the present green timber stand by volume, shows that the ratio of the #1, #2 and #3 classes in the stand have been increased, while #5 and #7 have been slightly decreased, but, on the whole, after seven years of more or less increasing infestation the stand is practically in the same condition of susceptibility as far as the tree classes go, as it was in the beginning; that is, altho the beetles have removed a considerable amount of the timber, they apparently have not done much to improve the character of the stand for resistance to further attack.

Graph #4 shows that the same order but not exactly the same values hold on the basis of number of trees. On the number of trees basis, Class #4, as well as Classes #5 and #7 are shown to have been attacked on a somewhat higher ratio than they appear in the stand and that the present stand is somewhat improved by containing a smaller percentage of these three most susceptible classes. However, the improvement is so small that it will have no appreciable effect upon natural control.

Graph #5 has been arranged to show the accumulative losses in each tree class during the different periods in the infestation since 1920. It shows on a larger scale practically the same thing as a comparison of Graphs #1 and #2; that is, with an average total of 19.1% for all the strips tallied, the #1, #2, and #3 tree classes were attacked much below the average, #6 slightly below average, #4 about average, and #5 and #7 somewhat more than average. This checks in general Keen's calculations for susceptible tree classes except that he found a slightly higher percentage loss in Class #4 than in Class #5. This difference is probably due to different segregations of the two tree classes in tallying.

An effort was made to determine the type of tree preferred by the beetle but our data were insufficient to give more than is shown by the graphs. However, we believe the following to be the order of susceptibility:

1. Tree Class #7,
2. Tree Class #5 - overmature #4,
3. Tree Class #4,
4. Tree Class #5 - overmature #3,
5. Tree Class #6,
6. Tree Class #2,
7. Tree Class #3,
8. Tree Class #1.

Nothing in our data will convincingly indicate that the elimination of the more susceptible tree classes #4, #5 and #7, without the elimination of the beetle population will result in a halt in the infestation without serious loss in the thriftier, more resistant tree classes, nor does the data show that unattacked trees can be picked within these susceptible tree classes, the removal of which will help to halt the infestation.

Graphs #5, #6 and #7 show the results of the two methods of marking previously discussed. They show that while the more or less minimum 18" diameter system used in tallying the leave of private lands resulted in only a slightly less volume per acre than on the government lands, the distribution by tree classes is much less desirable. A much smaller amount of the apparently beetle resistant tree class #3 is partially made up by the less resistant Classes #4, #6 and #7. From the standpoint of future susceptibility of the stand it would be very desirable if the company, when it comes to the green timber operation, would spend a small amount in marking the desirable trees to leave over the chosen minimum diameter.

The indicated leave per acre by tree classes is as follows:

	GOVERNMENT	PRIVATE	
		Heavy Infestation	Light Infestation
Tree Class #1,	305	310	316
" " #2,	340	245	255
" " #3,	403	62	95
" " #4,	14	62	54
" " #5,	-	-	-
" " #6,	16	42	15
" " #7,	17	62	50
Total:	1,080	785	785

Goldsmith cruised a portion of the area in 1914 and Evans cruised the remainder in 1926. Consequently, to determine the losses and the present stand, it is necessary to apply different correction factors to the two cruises.

The calculations of the western yellow pine losses and present stand are made in the following table:

ITEM	AREA OF HEAVY INFESTATION					AREA OF LIGHT INFESTATION				
	AREA	1914 STAND M Ft.	CORREC-TION FACTOR	LOSS	1926 STAND M FT.	AREA	1914 STAND M FT.	CORREC-TION FACTOR	LOSS	1926 STAND M FT.
Government	25,640	291,571	-11.8	34,405	257,166	1,920	14,761	-10.5	1,550	13,211
ITEM	AREA	1926 STAND M FT.	CORREC-TION FACTOR	LOSS	PRESENT STAND M FT.	AREA	1926 STAND M FT.	CORREC-TION FACTOR	LOSS	PRESENT STAND M FT.
Government,	25,640	257,166				1,920	13,211			
	1,320	8,623				18,720	153,438			
(Scattering)						22,440	44,910			
TOTAL GOVERNMENT,	26,960	265,789	-10.1	26,845	238,944	43,080	211,559	-3.7	7,828	203,731
Red River Lbr. Co.,	4,080	57,120	-13.6	7,768	49,352	160	2,240	-3.7	83	2,157
Pickering Lbr.Co.,	10,840	134,546	-13.6	18,298	116,248	33,440	458,003	-3.7	16,946	441,057
Miscellaneous Private,						3,090	3,120	-3.7	115	3,005
TOTAL PRIVATE:	14,920	191,666	-13.6	26,066	165,600	36,690	463,363	-3.7	17,144	446,219
TOTAL ON UNIT:	41,880	457,455		52,911	404,544	79,770	674,922		24,972	649,950

In addition to the western yellow pine, there is an estimated stand of 370 M feet B.M. white fir, and 1440 M feet B.M. incense cedar on the government lands within the area.

The following shows a comparison of the 1927 losses estimated in the present report and those estimated in Keen's report for this unit which he has divided into the Badger and the Pitt River

1927 LOSSES

OWNERSHIP	THIS REPORT	KEEN'S REPORT
Government,	34,673 M. B. M.	46,700 M. B. M.
Red River Lumber Company,	7,851 "	7,400 "
Pickering Lumber Company,	35,244 "	44,800 "
Miscellaneous Patented,	115 "	850 "
Total:	77,883 M. B. M.	99,750 M. B. M.

Our estimate of loss is somewhat lower than Keen's, due in part to a conservatism in our estimates of including the unexamined timber on the ridge in T. 42 N., R. 9 E., within the lighter infestation. Mr. Keen states that he flew over this area and it looks to be as heavily infested as the region around T. 44 N., R. 8 E. In the absence of definite strip data, we have thought it advisable to include it in the lighter infestation.

V. CONDITION OF TIMBER:

The western yellow pine in this unit, as well as in the whole of the Modoc Lava Beds region, is largely overmature and rather low in quality. As previously stated, the beetles appear to prefer the slower growing trees found in tree classes #4 and #7 and the overmature #4 trees found in class #5. Naturally the insect killed is smaller in size and lower in quality than the green timber that will be marked for cutting in the major operation.

144 acres of well distributed quality survey strips gave the following comparable data for government timber:

	Green timber to cut	1927 insect killed timber
Average size of tree	1,000 B feet	715 B feet
Average number of logs per M	4.2	5.1
Average percentage of #2 shop and better	26.0	20.0

It was found that the insect infested trees showed a considerable amount of blue stain beneath the bark. Even the 1927 winter killed trees which were attacked last fall had numerous scattered patches of blue stain three inches or more in diameter. Investigation with an increment borer indicated that these patches increased in length with the grain beneath the surface of the wood and extended through the sap. The probabilities are that the stain is worse higher up the bole of the tree where the insect attack is heavier and the percentage of sapwood is greater. Mr. Keen and some mill men who have been operating in insect timber are of the opinion that the blue stain spores enter with the beetles and begin to spread immediately. Until further information is obtained, we must assume that all of the sapwood from beetle killed trees will produce stained lumber.

VI. POSSIBILITIES OF CONTROL:

In view of the extremely heavy annual loss in the area it would seem that an effective control must treat from 35 to 40 M M feet B. M. per year. As the infestation is scattered more or less uniformly on government and private holdings, a control project on a single ownership would be a waste of money. The degree of infestation and the large area affected would make the usual methods of control (felling, pealing and burning) extremely expensive. Even were the cost, which Mr. Keen estimates at $4 per M feet, not prohibitive, much valuable time would be lost in getting the necessary money and considerable timber would be wasted.

Mr. Pickering's suggestion of a portable mill operation seems to be the most feasible method of quick control and timber utilization. An appraisal of the plan is necessary to determine the feasibility from the cost standpoint. At least three semi-portable mills have been operating in fire and insect killed timber in northern California and southern Oregon and have been averaging 15 to 20 M feet per shift at a fairly reasonable cost.

VII. PROPOSED METHODS OF CONTROL:

The beetles commence to emerge about early June and immediately attack another group of trees, spending about six weeks in these trees before the new brood emerges for a new attack. During the summer months there are beetles in flight practically all the time and due to the short time spent in the trees (about four weeks after the needles begin to turn) it will be rather difficult to locate the infested trees, fell them and get them sawn before the beetles emerge.

The winter attack takes place from September 1 to October 15 and the beetles have a long life cycle, remaining in the timber for 6 or 7 months until late May or early June, depending upon the season. The foliage begins to change color from ten days to two weeks after the attack so that the winter season offers a long period for location and handling and is the logical time for effective control work. In connection with winter operations, the slash should be burned on the unmerchantable portions of the down trees at the time of limbing. This method of slash disposal would help in control and would cost less than the usual method of piling after logging.

Mr. Keen states that the use of trap trees has not been entirely successful as the beetles do not always attack the traps but at times seem to prefer the surrounding timber. The trap trees will probably attract the beetles from some distance and even though they attack the surrounding timber some of the poorer quality trees might be used as traps to localize attacks and make detection and operation easier.

Mr. Keen also suggests that during the summer, extra fallers be used to fell and limb the infested trees ahead of the operation even though they are never logged. The souring of the sap through arrested transpiration and the exposure of the upper portions of the tree trunks to the direct rays of the sun will be of considerable assistance in control, although the results will not be 100 percent.

VIII. PROPOSED PLAN OF OPERATION:

As some of the timber in this region reaches a diameter of five feet, it will be necessary to use a double circular head rig. Several manufacturers make semi-portable mills of this type which, by their literature, are rated at capacities from 20 to 35 M feet B. M. per shift. Such a mill, provided with a lighting system and operated double shift for the full season could produce 10,000 M feet B. M. per year. On this basis four units could cut from 35,000 to 40,000 M feet B. M. per year, which should be sufficient for very effective control.

Naturally the majority of the control should be carried on in the regions of heaviest infestation and we recommend that the mills be first located about as shown on the attached map. One mill to be located at Badger Well in T. 44 N., R. 8 E., two mills along the south boundary of the township and the fourth mill at the point of heaviest infestation farther south. Keen states that an aerial examination of the timbered ridge southwest of Howard Gulch in T. 42 N., Rs. 8 and 9 E. indicates that this area is about as heavily infested as the region within the black line on the map. This then would probably be the logical place for starting the fourth mill.

As water is very scarce during the summer in this region, two or three wells should be developed and we believe that the suggested locations will best serve both the control operations and the camps of the major operation.

Of course, to be effective, the infested bark of the beetle trees must be burned as soon as sawn and this will mean the construction of waste conveyors and enclosed burning pits, which will tend toward making the mills less portable. This fact, together with the scarcity of water, we believe makes it desirable to log for two or three miles around a mill site rather than move the mill very often.

Both the McCloud Lumber Company and the Long-Bell Lumber Company log very economically in the winter time in regions very similar to this. There does not seem to be any logical reason why the actual logging and milling operations cannot be successfully carried on during the winter. Although the open flats that are found in the area get very soft when wet, the logging can be planned so that it will be unnecessary to cross them when they are not dry or frozen. One drawback to winter operation would be the hauling of camp supplies, gasoline, repair parts, etc. over the slippery, steep roads up Blacks Canyon from Canby. By laying in large stocks of supplies in the fall the additional hauling could be handled from Canby by a tractor and truss wheel wagon.

In order to insure minimum timber loss in the region it will undoubtedly prove desirable to start a regular operation for the removal of the green timber within a few years. The Pickering Lumber Company has fairly definite plans of locating a band mill in the vicinity of Alturas and transporting the logs from this region by railroad. As the railroad will have to be built into the area at some future date, it is desirable that it be built as soon as possible and used in connection with the control operation, leaving the construction cost to be depreciated against the green timber to be logged later. Such a plan would not only facilitate winter operation but would also deliver the sawn lumber forty miles into Alturas for about $4.00 per M feet B. M., whereas trucking the year's cut during the dry season would cost from $7 to $10 per M feet B. M. and would wreck the highways. The longest lumber haul reported last year was 28 miles, for which the contract prove was $7 per M feet B. M.

We therefore recommend that the control operation be started this fall in sufficient time to take full advantage of the winter infestation, cutting the material into ties sufficient for the construction of a railroad next year, and into timbers for the construction of a box factory and planing mill near Alturas to help in the sales of the lumber.

During the winter season the operation should be entirely on a control basis cutting only the trees which contain beetles, in order to get rid of as large a beetle population as possible. During the short occupancy periods of the summer months it will probably prove difficult to get a large proportion of the infested trees sawn before the beetles have emerged. The operation to continue at an efficient capacity will be a combination of control and salvage. The infested trees should be felled and limbed immediately to insure partial control. However, as these trees will be scattered and as the beetles will have emerged from most of them before it is possible to saw them, it may prove advisable to depend on more accessible trees from which the beetles have emerged for the main supply of the mills.

It is desirable to utilize the still infested trees to the smallest practical diameter but in trees where emergence has occurred it is advisable to salvage the better portions and we suggest a minimum log diameter of twenty inches.

Although the mills will be located in the areas of heaviest infestation and their main supply will be from fairly short hauls by tractors or trucks, there is a large area of lighter infestation where the scattered groups should receive some attention. Light trucks with trailers hauling from 800 to 1200 feet B. M. can easily be used over most of this area without much road work and three of them would be very effective in the scattered areas. Horses could be used for bunching and loading.

IX. APPRAISAL OF INSECT KILLED TIMBER:

In accordance with the preceding discussion of control methods, the appraisal has been based upon railroad transportation of the lumber to a finishing plant in Alturas and the following woods equipment:

Four sawmill units, each capable of producing 35 M to 40 M feet B.M. per two-shift day. It is assumed that these plants will be operated an average of 270 days and will produce 10,000 M feet per unit, or a total of 40,000 M feet per year. It is probable that control will be effected or discontinued, or that the major operation will be undertaken within three years. Therefore, 120,000 M feet B.M. has been used as the footage over which the equipment should be depreciated. The logging equipment will, of course, be used in connection with the major operation and only that portion pertaining to the control operation has been included in the cost.

The equipment necessary for the control project, with estimated delivered prices, is as follows:

Plant Per Unit:

Sawmill,	$1,800
Edger,	1,000
Log turner,	400
Conveyor and burning pit,	1,500
Assembly,	1,000
Yard equipment,	2,000
Tractor,	1,500
	$9,200

The tractor cost is estimated for one of the second-hand 75 H.P. gas machines, altho I understand that good second-hand engines from these machines can be secured, mounted on sleds, for less than $1,000.

Investment:	Cost	Chargeable to Control Operation
Four sawmill units,	$40,000	$40,000
Six tractors,	32,000	24,000
Three truss wheel wagons,	10,500	7,800
Four 3/4 ton auto trucks with trailers,	3,200	3,200
Eight head of horses,	2,000	2,000
Miscellaneous equipment,	2,000	2,000
One heavy road grader,	2,000	1,000
Total:	$91,700	$80,000

Depreciation: 67¢ per M Ft.B.M.

Logging Costs:

Logging,	$6.00	per M Ft.B.M.
Sawing,	4.00	" " " " "
Yard and Shipping,	4.50	" " " " "
Overhead,	2.75	" " " " "
Lumber haul to Alturas (40 miles),	4.00	" " " " "
Depreciation (not railroad),	.67	" " " " "
	$21.92	" " " " "

Selling Price:

The selling price calculations are based upon stain lumber grade prices reported to have been received for #3 shop and better during the past three years. The average sales reported were about 5,000 M Feet B.M. per year. The lower or common grades will admit some stain, and altho the smaller logs will produce stained common from the sapwood, the regular average three year selling prices have been used.

The calculations were checked within a few cents by using stained lumber prices for the upper grades as reported for sales of 6,000 M feet B.M. last year by the California White and Sugar Pine Manufacturers Association.

It is probable that all of the upper grades and some of the lower, or about 30% of the lumber produced from these beetle killed trees, will be stained to some extent. On the basis of a 40,000 M feet B.M. production, this would mean 12,000 M feet B.M. of stained lumber. It is impossible to tell whether the market will absorb this additional footage at the prices used in the calculations.

WESTERN YELLOW PINE AVERAGE SELLING PRICE

Based on 1925-26-27 Averages

Stained lumber prices for #3 Shop and Better
Insect killed trees not over one year old

LUMBER GRADE	PERCENT	AVERAGE PRICE	WEIGHTED VALUE
1 & 2 Clear,	.4	78.50	.31
C Select,	.8	55.00	.44
D Select,	2.2	48.25	1.06
3 Clear,	.4	45.75	.18
1 Shop,	3.4	36.25	1.23
2 Shop,	12.8	23.25	2.98
3 Shop,	9.8	22.00	2.16
1 & 2 Common,	15.4	29.25	4.50
3 Common,	32.5	23.00	7.47
4 Common,	22.3	17.00	3.79
			24.12
Extended by 3.2% overrun,			24.87

The present freight rate schedules from Alturas are:

$1.10 per M Feet higher than Susanville for eastern shipments,
$3.50 per M Feet higher than Susanville for California shipments,
$.45 per M Feet higher than Klamath Falls for eastern shipments,
$3.19 per M Feet higher than Klamath Falls for California shipments.

On the basis of shipments of 60% to California and 40% to the east, this would be a differential of $2.50 per M more than Susanville and $2.10 more than Klamath Falls.

As the average selling prices are based upon rates which are comparable to Susanville, it is evident that realization values must consider the differential in freight rates.

It seems reasonable to expect that several years prospective business of 40,000 M feet per year, together with the probable connecting link for the Southern Pacific Railroad from Alturas to Klamath Falls, would result in a rate reduction. Possibly a reasonable rate would be 50¢ per M feet higher than Susanville for eastern shipments and $1.10 higher for California shipments. On this basis the rate differential to subtract from the selling price would be 86¢ per M feet.

Selling price,	$24.87 per M
Freight differential	.86
Selling price f.o.b. Alturas	$24.01
Operating Cost,	21.92
Total Margin,	2.09
Stumpage price,	.50
Margin for profit and risk,	$1.59 per M
Interest on railroad investment	.70
Indicated margin for profit:	$.89 per M

The calculations indicate that in addition to providing for depreciation of the equipment and paying the interest charges on railroad construction, the control and salvage operations might allow a small margin for profit under the most favorable conditions of low production costs, present selling prices for stained lumber, railroad transportation for the lumber to Alturas, and an equalization of freight rates.

However, this margin could easily be turned into a loss under adverse conditions but certainly not to the extent of $4.00 per M feet B.M. that would be necessary under the usual methods of control.

The writers believe that this method of control will have the desired results and is the most practical from the standpoint of cost, timber utilization and quickness of control.

The ownership by the Red River Lumber Company of 4,080 acres of timberland within the heavily infested area in the eastern portion of T.44 N., R. 7 E., complicates the situation to some extent. It would be undesirable

to leave this area untreated as it would provide a breeding place for beetles which would re-infest the government and the Pickering holdings in the vicinity. The Pickering Lumber Company owns about the same acreage adjoining the Red River Lumber Company lands in T. 42 N., R. 6 E., of the Happy Camp Unit that is heavily beetle infested. It is possible that an exchange could be made between these two companies so that the entire Badger Springs Unit could be covered by control.

X. APPRAISAL OF GREEN TIMBER:

The Pickering Lumber Company plans the construction of a band mill in the vicinity of Alturas, as soon as the lumber market makes such a plan feasible, to which the logs will be delivered from this region by railroad.

The Southern Pacific Railroad Company has obtained permission to build southward from Klamath Falls, Oregon, to Cornell, California, and have made a survey for a line from Cornell, southeastward, thru this area, into Alturas. The Railroad Company probably plans the construction of such a connecting line but it is impossible to obtain any information concerning its plans. It is very probable that a railroad built into this area by the purchaser, along this survey, before the S. P. R. R. Company is ready to construct such a line, could be turned over to the Railroad Company without loss.

Considering the unsettled railroad situation and the indefinite estimates of green timber that would be handled over such a road, it is advisable at the present time to use the overturn method of calculating the margin for profit and risk.

As the green timber within this proposed sale area will not be operated for some time and as the beetle infestation will continue to reduce the supply by an unknown amount, it is our intention to make a conservative appraisal in order that the established stumpage rates will not be higher than can be shown by the next reappraisal, which will be based upon better data:

Operating Costs: (Based upon a comparison of the local conditions with the 1925-26-27 District averages.)

Logging - tractor,	$4.35 per M Ft.,
Log transportation - 40 miles on common carrier,	4.00 " " "
Spur construction,	.80 " " "
Brush Disposal,	.50 " " "
Deposit for snag disposal,	.05 " " "
Woods depreciation,	.50 " " "
Total Cost into Pond:	$10.20 per M Ft.

Sawing,	$3.11	
Yard and shipping,	4.72	
General Expense,	4.13	
Plant Depreciation,	.78	
	$12.74	Extended by 9.6% overrun, $13.96 per M Ft.,

Total operating cost, log scale, $24.16 per M Ft.

Estimates:

On the basis of the table of correction presented earlier in the report, the present stand of the proposed sale area is estimated to be as follows:

OWNERSHIP	AREA	ESTIMATED STAND M FT.	MARKING PERCENTAGE	ESTIMATED CUT M FT.	PERCENTAGE OF CUT BY SPECIES
Government:					
West. Yellow pine,		442,675	90	398,407	99.6
White fir,		370	80	296	.1
Incense cedar,		1,440	80	1,152	.3
Sub-Total:	70,040	444,485		399,855	
Pickering Lbr.Co.,	44,280	557,305	90	501,574	
Red River Lbr.Co.,	4,240	51,509	90	46,352	
Miscel. Private,	3,090	3,005	90	2,700	
Total on Area:	121,650	1,056,304		950,481	

Average Selling Price:

The lumber grade percentages are based upon 144 acres of log quality strips in T. 44 N., R. 8 E., as shown on the map. Ten percent of each green lumber grade resulting from the calculations has been dropped into the next lower grade to cover yard degrade. The overrun figure has been obtained by applying a table of overrun percentages by log diameters to the volume found in each log diameter class for the strips tallied. This overrun is higher than average because of the small tapering timber.

The quality of this timber is very low because of the small size and numerous pin knots. Apparently it is about the same as the timber on the Shasta National Forest north of Glass Mountain, where the indicated upper grades amounted to 24.7% of the stand.

SELLING PRICES

Based on 1925-26-27 District Averages

WESTERN YELLOW PINE

LUMBER GRADE	PERCENTAGE	AVERAGE SELLING PRICE	WEIGHTED VALUE
1 & 2 Clear,	.9	88.25	.79
C Select,	1.5	72.75	1.09
D Select,	3.7	56.75	2.10
3 Clear,	.7	59.25	.41
1 Shop,	4.7	48.25	2.27
2 Shop,	14.5	29.50	4.28
3 Shop,	10.3	22.00	2.27
1 & 2 Common,	12.9	29.25	3.77
3 Common,	29.9	23.00	6.88
4 Common,	20.9	17.00	3.55
			27.41
Extended by 9.6%,			30.04

	WHITE FIR	INCENSE CEDAR
Average selling price,	$21.00	$23.75
Extended by 10% overrun,	23.10	26.12

AVERAGE SELLING PRICE F.O.B. LOADED CAR AT ALTURAS

SPECIES	PERCENTAGE	AVERAGE SELLING PRICE	WEIGHTED VALUE
Western Y.Pine,	99.6	$30.04	$29.92
White fir,	.1	23.10	.02
Incense cedar,	.3	26.12	.08
			$30.02
Estimated freight rate differential,			.90
Average Selling Value, log scale,			$29.12

Indicated Stumpage Prices:

Average selling price,	$29.12	per M Ft.,
Average operating cost,	24.16	" "
Total Margin:	$4.96	" "
Margin for profit and risk at 10% of the operating cost, including stumpage price,	$2.64	" "
Indicated Stumpage Value:	$2.32	per M Ft.

RECOMMENDATIONS:

It is quite possible that withholding this timber from the market until the railroad situation clarifies itself, would result in $1.00 per M feet higher stumpage rates under competative bidding. However, when we consider the fact that continued beetle attacks have already reduced small portions of the area to the border line of unmerchantability, it is impossible to forecast the amount of timber that would be left by the time competative bidders become interested.

We do know that on an area containing 400,000 M Feet B.M., within the boundaries of the heaviest infestation, the loss increased from 3% in 1926 to 11.5% in 1927, and the present condition of the timber and the large beetle population that will emerge this spring point toward further increases in the loss. The remainder of the unit, with an estimated stand of 650,000 M feet B.M. is in practically the same condition as the other area was in the spring of 1927, with every indication that this year will see increased losses over the whole area with serious epidemic conditions in some localities.

In view of these conditions it is recommended that the government timber within the unit outlined on the attached map be advertised for sale at the following rates: Western yellow pine live timber at $2.25 per M feet B.M., western yellow pine merchantable beetle killed timber, white fir, and inconse cedar at 50¢ per M Feet B.M., and under the following conditions:

1. The purchaser shall start a control and salvage operation on both government and private lands by October 1, 1928, and shall remove from the sale each year thereafter at least 35 MM feet B.M., of which at least 20 MM Feet B.M. shall be from government lands until the beetle situation in this particular unit is under control or the contract is cancelled by mutual agreement.

2. The purchaser shall construct a modern band mill within Modoc County which will be ready for operation by July 1, 1933: Provided that the purchaser can forfeit the contract at any time between January 1, 1930 and July 1, 1933, without such forfeiture constituting a basis for damage claim by the government.

3. Unless a common carrier railroad is constructed into the area before July 1, 1933, the purchaser shall construct a railroad, not necessarily a common carrier, from Alturas to the head of Howard Gulch near the northwest corner of T. 42 N., R. 9 E., over which the Forest Service, or any person designated by the Forest Service, may ship lumber manufactured from government timber outside the proposed sale area. This would provide a means for possible desirable control operations in other portions of the region.

4. Only beetle killed trees and a few low quality live trees used as traps shall be marked for cutting, until the beetle situation is under control or the band mill is in operation.

5. The purchaser shall make a sincere effort to operate thru the winter months in order to take advantage of the long period that the beetles are in the trees.

SAMPLE AGREEMENT:

In order to tie the beetle control work to the sale of the green timber it has been necessary to write several special clauses into the attached sample agreement. Altho these clauses are in rather rough form, due to the absence of legal advice, we believe they contain the essential points.

UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

(Designation) SAMPLE

TIMBER SALE AGREEMENT

Description of Timber.—1. ____ (I or we), ____ (If copartnership, "We, ____ and ____ partners, doing business under the firm name of ____") (If corporation, "A corporation organized and existing under the laws of the State (or Territory) of ____, having an office and principal place of business at ____")

of ____, State of ____, hereinafter called the purchaser, hereby agree to purchase from an area of about 70,000 acres to be definitely designated on the ground by a Forest officer prior to cutting, in Badger Springs Unit, comprising parts of the following (Give approximate location and describe by relation to some well-known landmark, stream, etc.)

legal subdivisions: T. 41 N., R. 8 E., N.D.M., T. 42 N., Rs. 7, 8 and (Give also legal subdivisions if surveyed, and approximate legal subdivision if unsurveyed)

9 E., N.D.M., T. 43 N., Rs. 6, 7, 8 and 9 E., N.D.M., T. 44 N., Rs. 6, 7, 8 and 9 E., N.D.M., and T. 45 N., R. 8 and 9 E., N.D.M., as definitely designated on the attached map of the Badger Springs Unit which is hereby made a part of this agreement:

____ within the Modoc National Forest, at the rate or rates and in strict conformity with all and singular the requirements and conditions hereinafter set forth, all the dead timber standing or down and all the live timber marked or designated for cutting by a Forest officer, merchantable as hereinafter defined for sawlogs (Name products to be cut, saw logs, ties, etc.)

Timber upon valid claims and all timber to which there exists valid claim under contract with the Forest Service is exempted from this sale. The estimated amount to be cut under the methods of marking described in section 4 is ____

Western yellow pine, 398,407 M feet B. M. (Give by species the quantity in proper unit of measure, state whether live or dead, and kind of material)

Incense cedar 1,152 M feet B. M., a total of 399,855 M feet B. M., more or less; PROVIDED, That any material below the specifications for sawlogs as herein defined shall be cut at the option of the purchaser, subject to the charge specified herein for all or any part of such material at the discretion of the District Forester.

____, more or less.

Payments.—2. The purchaser hereby agrees to pay to the Federal Reserve Bank of San Francisco, California (United States depository), or such other depository or officer as shall hereafter be designated, to be placed to the credit of the United States, for the timber at the following rates:

8—4140 U. S. GOVERNMENT PRINTING OFFICE: 1927

2a. For all timber cut and scaled prior to July 1, 1932 at the rate of $2.25 per M feet B. M. for live western yellow pine; $.50 per M feet B. M. for merchantable insect killed yellow pine; $.50 per M feet B. M. for white fir; $.50 per M feet B. M. for incense cedar; for any material below the specifications for sawlogs as herein defined, $.50 per M feet B. M.

For all timber scaled on or after July 1, 1932 and prior to July 1, 1935 at such rates as shall be designated by the Forester within thirty days preceding July 1, 1932.

For all timber scaled on or after July 1, 1935 and prior to July 1, 1938 at such rates as shall be designated by the Forester within thirty days preceding July 1, 1935.

For all timber scaled on or after July 1, 1938 and prior to July 1, 1941 at such rates as shall be designated by the Forester within thirty days preceding July 1, 1938.

For all timber scaled on or after July 1, 1941 and prior to July 1, 1944 at such rates as shall be designated by the Forester within thirty days preceding July 1, 1941.

For all timber scaled on or after July 1, 1944 at such rates as shall be designated by the Forester within thirty days preceding that date.

2b. The Forester shall reappraise and within at least 30 days preceding each of the foregoing dates designate the value of each species in consideration of current operating conditions and markets in the California Pine Region, including the operation of the purchaser, such reappraisals to include the timber on the entire tract, and to be based upon an equitable margin for profit and risk to the purchaser under the operating conditions prevailing throughout the region.

2c. If any material cut under this agreement and merchantable under its terms is manufactured or sold by the purchaser in other forms than sawlogs, the Forester may upon the next reappraisal date establish a special stumpage rate for each class of material so manufactured or sold during the succeeding period, which rate, in accordance with the ratio per thousand board feet, currently used by the Forest Service, shall be not less than the initial stumpage price fixed herein and shall allow the purchaser an equitable margin for profit and risk under current selling prices and costs of production in the region defined above. The Forester may redetermine by reappraisal on an equitable basis, on each of the dates designated above for readjustment of stumpage prices, the rate specified herein for material below the specifications for sawlogs as herein defined. The purchaser shall furnish upon request of the District Forester a statement by species of the amount, grade if any and value received for

each class of material cut under this agreement and manufactured or sold by him in other forms than those specified in Section 1 of this agreement.

2d. It is further agreed that the Secretary of Agriculture will, upon written application of the purchaser showing good and sufficient reasons therefor and specifically the existence of a serious emergency arising from changes in market conditions since the last reappraisal, at his option, when action of either character is necessary to relieve the purchaser from hardship, either:

1. Redetermine and establish the stumpage rates and designate a date when the rates as redetermined shall be effective, which date shall be within six months of the date of application; or

2. Grant an extension of time, within which the respective amounts of timber specified in Section 3 shall be removed, not to exceed the total period allowed for cutting all the timber.

Any stumpage rates redetermined upon application to the Secretary shall be determined in accordance with the methods and under the terms above set forth and shall apply only during the remainder of the three year period then current when the rates shall be regularly designated after reappraisal.

2e. In no event, however, will the stumpage rates for products from material the utilization of which is required by this agreement as established upon any date above named or upon application from the purchaser, be less than those specified herein to be paid for timber scaled prior to July 1, 1932.

2f. At the date of any reappraisal of stumpage prices the Forester may require such modifications in the sections numbered 3, 4, 5, 6, 8a, 8b, 10, 15, 15a, 15b, 15c, 15d, 15e, 16, 16a, 17, 18, 19, 19a, 19b, 19c, 19d, 19e, 19f, 19g, 19h, 19i, 19j, 19k, 19l, 19m, 19n, 19o, 39 and 39 in this agreement as are necessary, in his judgment, to protect the interests of the United States. Such modifications shall be limited to requirements contined in timber sale contracts current at the time of reappraisal in the California Pine Region and shall be practicable under the existing equipment and organization of the purchaser except as changes in equipment may be required by the terms of this agreement. Any additional operating costs entailed by such modifications, as ascertained by the District Forester, shall be taken into consideration as factors in reappraisals.

Payments shall be made in advance installments of not less than Five Thousand Dollars ($5,000.00) and not more than Twenty Five Thousand Dollars ($25,000.00) each as determined by the Forest officer in charge and when called for by him, except just before the completion of the sale or before a period when cutting operations are to be suspended for at least four months, when the amount of the payment may be reduced in writing by the Forest Supervisor, credit being given for the sums, if any, heretofore deposited with the said United States depository or officer in connection with this sale.

3. Unless extension of time is granted, all timber shall be cut and removed and the requirements of this agreement satisfied on or before December 31, 1948. Unless such amounts are reduced in writing by the Forester at least 27,000 M feet B. M. of insect killed timber of which at least 20,000 M feet B. M. shall be National Forest stumpage shall be cut prior to July 1, 1929; at least 35,000 M feet B. M. of insect killed timber of which at least 20,000 M feet B. M. is National Forest stumpage shall be cut annually until July 1, 1933; at least 195,000 M feet B. M. of National Forest stumpage prior to July 1, 1938; at least 315,000 M feet B. M. of National Forest stumpage prior to July 1, 1944.

4. Live timber shall be marked for cutting as follows: Not less than 80 percent by volume of the total stand of merchantable live timber included in the agreement, consisting of western yellow pine, white fir and incense cedar trees twelve inches and over in diameter at a point four and one-half feet above the ground shall be marked or designated for cutting on the areas designated for cutting.

PROVIDED, That marking will be confined to insect killed timber until July 1, 1933 unless marking of live timber is authorized by the Forester in writing.

153

Merchantability.—5. Any tree which in the judgment of the Forest officer contains one or more logs, merchantable as hereinafter defined and having a net total scale of 25 per cent or more of the total volume of the tree, may be marked or designated for cutting as a merchantable tree.

6. All western yellow pine (Species) logs are merchantable which are not less than 10 feet long, at least 10 inches in diameter inside bark at the small end, and after deductions for visible indications of defect scale 33⅓ per cent of their gross scale; and logs of other species not less than 10 feet long, 10 inches in diameter inside bark at small end, and scaling 50 per cent of their gross scale: Provided, That firm pine (Name defects for which deductions will not be made in scaling) stain shall not be regarded as defects.

except where otherwise provided in this agreement.

Material unmerchantable on account of defects may be removed without charge in the discretion of the District Forester.

Scaling.—7. Material shall be piled or skidded for scaling, measurement, or count if required by the Forest officer in charge and in such manner as he shall direct. The title to all timber included in this agreement shall remain in the United States until it has been paid for, and scaled, measured, or counted.

Saw logs shall be scaled by the Scribner Decimal C log rule, at the small end on the average diameter inside bark taken to the nearest inch.

8. The maximum scaling length of saw logs shall be 16 feet; greater lengths will be scaled as two or more logs. Upon all logs 5 inches shall be allowed for trimming. Logs overrunning the specified trimming allowance shall be scaled not to exceed the next foot in length.

8a. A Forest Service scaler shall be employed continuously on each unit of the sale area requiring the services of one man while logging is in progress at the rate of not less than 30 M feet B. M. daily.

8b. Logging operations shall be so conducted as to permit scaling to be done economically, and timber or logs from private or State land shall not be mixed at the point of scaling with timber or logs from Government land unless each log from private or State land is marked, prior to skidding, with a distinguishing mark satisfactory to the Forest officer in charge.

U. S. GOVERNMENT PRINTING OFFICE. 1927 8—4140

Logging.—**9.** As far as may be deemed necessary for the protection of National Forest interests, the plan of logging operations on the sale area shall be approved by the Forest Supervisor or by the officer to whom he may have delegated authority to give this approval. Operations begun on any natural logging area shall be completed in accordance with the terms of this agreement before cutting may begin on other areas, unless such cutting is authorized in writing in which event cutting shall be completed on the area left unfinished as soon as practicable. After decision in writing by the Forest officer in charge that the purchaser has complied satisfactorily with the contract requirements as to specified areas, the purchaser shall not be required to do additional work on such areas.

10. Any method of logging other than by means of Horses, trucks and tractors
(Indicate approved and expected methods as "horses and caterpillar tractors with not more than two tractors hauling to one loading place")

may be employed only with the advance approval in writing of the Forest officer approving this agreement and under such conditions and restrictions as he may require.

11. As far as practicable all branches of logging shall keep pace with one another, and in no instance shall brush disposal be allowed to fall behind cutting, except when the depth of snow or other adequate reason makes proper disposal impracticable, when the disposal of brush may, with the written consent of the Forest officer in charge, be postponed until conditions are more favorable.

12. The purchaser shall cut all and only marked or designated live trees and shall remove all merchantable logs from the sale area. No timber shall be cut until paid for, nor removed from the place or places agreed upon for scaling until scaled, measured, or counted by a Forest officer.

13. No unnecessary damage shall be done to young growth or to trees left standing. Unmarked or undesignated trees which are badly damaged in logging shall be cut if required by the Forest officer in charge.

14. On those portions of the sale area on which felling has been or is being done, marked or designated trees left uncut, and unmarked or undesignated trees which contain merchantable material and which are cut, injured through carelessness, or killed by fires which the purchaser, his employees, contractors, or employees of contractors caused, or the origin or spread of which he or they could have prevented, shall be paid for at double the current price, fixed by the terms of this agreement, for the class of material said trees contain: *Provided*, That such payment shall not release the purchaser from liability for any damage to the United States other than the value of said trees. Timber wasted in tops or stumps, marked or designated timber broken by careless felling, and any timber merchantable, according to the terms of this agreement, which is cut and not removed from any portion of the cutting area when operations on such portion are completed, or before this agreement expires or is otherwise terminated, shall be paid for at the current price for such material. The amounts herein specified shall be regarded as liquidated damages and may be waived in the discretion of the Forest officer in charge in accidential or exceptional cases which involve small amounts of material. Unless extension of time is granted by the Forest Supervisor the right, title, and interest to any timber for which payment has been made under the provisions of this section shall revert to the United States without compensation unless it shall have been removed from any portion of the sale area accepted by the Forest officer in charge within the 6 months next succeeding the date of such acceptance, or from the remainder of the sale area during the same number of months next succeeding the date of expiration or termination of this agreement.

15. Stumps shall be cut so as to cause the least practicable waste, and not higher than 14 inches on the side adjacent to the highest ground, except that when this requirement is impracticable in the judgment of the Forest officer, he may authorize or accept higher stumps; all trees shall be utilized to as low a diameter in the tops as practicable and to a minimum diameter of 10 inches when merchantable, except that in the control
(Specify different diameters for different species, if necessary)
~~when merchantable. The log lengths shall be varied so as to secure the greatest possible utilization of merchantable material.~~

15a.
operation insect killed trees from which the insects have emerged will be utilized to a minimum diameter of twenty inches. The log lengths shall be varied so as to secure the greatest possible utilization of merchantable material.

U. S. GOVERNMENT PRINTING OFFICE: 1927 8—4140

15a. All marked diseased trees and all standing unmerchantable dead trees on the sale area shall be cut. This work shall be done currently with the felling of the merchantable timber or, in the discretion of the Forest officer in charge, within 30 days after logging is completed on any unit he may designate. Such trees after felling shall be opened up sufficiently to satisfy the Forest officer in charge of their contents, and any portions thereof which are, in his judgment, merchantable as herein defined, shall be scaled and paid for and may be removed by the purchaser.

If required by the Forest Supervisor, instead of cutting the standing unmerchantable dead trees on the sale area, and in addition to making advance payments for stumpage as herein provided, the purchaser further promises and agrees to deposit in the above named depository, when called for by the Forest Supervisor, such sum or sums as will amount to five cents per thousand feet B. M. for the total cut of green timber under this agreement, to be covered into the Treasury of the United States as a part of the special fund for paying the cost of the disposal of standing unmerchantable dead trees on sales of National Forest timber, including this sale; and the purchaser shall not be required to cut the standing unmerchantable dead trees on this sale area except as may be provided for elsewhere in this agreement.

15b. Any trees on that portion of the sale area where logging is in progress which become infested with insects during the life of this agreement shall be disposed of at such times and in such manner as may be required by the Forest officer in charge.

15c. All rigging shall be slung on stumps or marked trees as far as practicable. Main line rigging shall not be slung on unmarked trees unless unavoidable. When it is necessary to use unmarked trees, straps adjusted in a manner satisfactory to the Forest officer in charge shall be used and proper bushing shall be placed under each strap to prevent damage. All rigging shall be removed from unmarked trees before the end of the logging season.

15d. On each tractor logging unit of this sale area where the average daily output is 100 M feet B. M., or more, the purchaser shall employ a man whose sole duty shall be the direction and supervision of timber cutting and another man whose sole duty shall be the direction and supervision of tractor logging. On any such unit where the output is less than an average of 100 M feet B. M. daily, the purchaser shall delegate responsibility for timber cutting and tractor logging to one or more competent men employed continuously on such unit.

156

Brush Disposal.—16. Slash shall be disposed of as follows: Tops shall be lopped and slash piled in compact piles in accordance with the requirements of the Forest officer in charge, except that in the control operation between October 1 and May 1 the slash may, at the discretion of the Forest officer in charge, be thrown over the unmerchantable portions of the trees and burned currently with the limbing.

16a. The purchaser agrees to furnish a sufficient number of men (not exceeding 10 yearly) without cost to the government, for a sufficient period, as determined by the Forest officer in charge to burn the brush and debris resulting from this sale. The men shall be furnished at such times as the Forest officer in charge shall specify, and they shall be placed under his direction and control for the brush burning work, provided that the purchaser shall not be held responsible for damage to the United States resulting from fires started to dispose of brush under the supervision of the Forest officer in charge if all precautions required by him were taken. The purchaser also agrees to furnish oil for brush burning without cost to the government, if required by the Forest officer in charge.

If required by the Forest Supervisor, instead of furnishing men for brush burning work, and in addition to making advance payments for stumpage as herein provided, the purchaser further promises and agrees to deposit in the above-designated depository, when called for by the Forest Supervisor, such sum or sums as will amount to six cents per thousand feet B.M. for the total cut of timber under this agreement, to be covered into the Treasury of the United States as a part of the special fund for paying the cost of the disposal of defective or undesirable trees and brush and other debris resulting from cutting operations in sales of National Forest timber including this sale; and the purchaser shall not be required to burn the brush and debris resulting from this cutting operation except as may be provided for elsewhere in this agreement. The purchaser agrees to furnish board and lodging, when requested by the Forest Supervisor, to Forest Service employees engaged in brush disposal under the provisions of this agreement, for which payment shall be made at the prevailing rates charged his own employees; provided his cook house and bunk houses are open at the time the brush disposal work is being done.

U. S. GOVERNMENT PRINTING OFFICE: 1927 8—4140

157

Fire Precautions.—17. During the time that this agreement remains in force the purchaser shall independently do all in his power to prevent and suppress forest fires on the sale area and in its vicinity, and shall require his employees, contractors, and employees of contractors to do likewise. Unless prevented by circumstances over which he has no control, the purchaser shall place his employees, contractors, and employees of contractors at the disposal of any authorized Forest officer for the purpose of fighting forest fires, with the understanding that unless the fire-fighting services are rendered on the area embraced in this agreement or on adjacent areas within one mile of the exterior boundaries of this sale area
(Describe by topographic features or as a belt of a specified width around the sale area)

payment for such services shall be made at rates to be determined by the Forest officer in charge, which rates shall not be less than the current rates of pay prevailing in the said National Forest for services of a similar character: *Provided*, That the maximum expenditure for fire fighting without remuneration in any one calendar year, including the furnishing of special trains and other special service as required at rates of pay determined as above, shall not exceed $ 10,000; *And provided further*, That if the purchaser, his employees, contractors, or employees of contractors caused or could have prevented the origin or spread of the said fire or fires, no payment shall be made for services so rendered, nor shall the cost of such services be included in determining said maximum expenditure for any calendar year.

18. Except in serious emergencies as determined by the Forest Supervisor the purchaser shall not be required to furnish more than fifty men for fighting fires outside of the area above specified, and any employees furnished shall be relieved from fire fighting on such outside areas as soon as it is practicable for the Forest Supervisor to obtain other labor adequate for the protection of the National Forest.

19. During periods of fire danger, as may be specified by the Forest officer in charge, the purchaser shall prohibit smoking and the building of camp and lunch fires by his employees, contractors, and employees of contractors within the sale area except at established camps, and shall enforce this prohibition by all means within his power: *Provided*, That the Forest officer in charge may designate safe places where, after all inflammable material has been cleared away, camp fires may be built for the purpose of heating lunches and where, at the option of the purchaser, smoking may be permitted.

19a. During the period from April 1 to November 15 of each year the ground around each track loader and other like logging engines shall be cleared of all inflammable material, including dead trees, for a distance of at least 100 feet in all directions when such action is considered necessary in the judgment of the Forest officer in charge.

19b. All railroad rights-of-way on National Forest lands and on lands owned or controlled by the purchaser within one-half mile of this sale area, which are in use at any time between May 1 and November 1, shall be cleared of inflammable material in accordance with the requirements of the Forest officer in charge to a width of 30 feet on each side of the center line of tracks except that at designated places for the sanding of the locomotive flues, selected by mutual agreement between the purchaser and the Forest officer in charge, the ground shall be cleared to a width of 100 feet on each side of the center line of tracks and for a linear distance parallel with the right-of-way of not less than 1,000 feet.

19c. All burning incidental to the clearing of rights-of-way for railroads, or roads, and of loader landings shall be done before June 1 or after October 1 of any year, except as this requirement is waived in writing by the Forest Supervisor with such stipulations as he may require. During the period from June 1 to October 1 of each year, no other brush, slash, debris or camp refuse shall be burned without the written consent of the Forest officer in charge and fires for warming lunches shall be lighted only at such places as he may specify.

19d. From April 1 to November 15 of each year, oil shall be used exclusively as fuel in all locomotives, track loaders, track skidders and cranes operating in connection with this sale. The use of oil as

U. S. GOVERNMENT PRINTING OFFICE: 1927 8—4140

0 153

fuel in all other steam logging contrivances operating upon National Forest land and used continuously within three hundred feet ~~three hundred feet~~ of railroad tracks may be required by the Forest officer approving this agreement; provided that said Forest officer shall give the operator six months advance notice of his intention to require the use of oil in other steam logging contrivances.

If wood is used to start or to maintain fires in any oil burning machine, that machine shall not be operated or moved until it is under steam with oil as fuel and until all wood has been consumed or removed from the fire box.

19e. From April 1 to November 15 of each year, each locomotive, loader or other machine having a steam boiler and exhausting into the stack or using any form of forced draft shall be equipped with a spark arrester satisfactory to the Forest officer in charge. Such spark arresters shall be kept in use at all times when there is fire under the boiler, and shall be maintained in effective condition. Each piece of such equipment shall be equipped with a connected steam force pump with steam cylinders of at least 3 inches diameter, water cylinders of at least 2 inches diameter and length of stroke at least 3 inches; at least 200 feet of serviceable hose, at least 1½ inches in diameter, with nozzle attached, ready for immediate use at all times, and a supply of at least 600 gallons of water: PROVIDED, That the supply of water in the tender shall be deemed satisfactory for a locomotive. This equipment shall be tested at such times as the Forest officer in charge may require.

19f. During the period from April 1 to November 15 of each year, each loader or other steam engine used in logging or construction work in connection with this sale, shall be equipped with one five-gallon water pack can with hand pump, six pails and a suitable box sealed with Forest Service seal, containing seven shovels and three axes. During the same period each tractor shall be equipped with a spark arrester satisfactory to the Forest officer in charge, a shovel, and a chemical fire extinguisher of not less than one and one-half quarts capacity and each locomotive shall be equipped with at least three shovels and one axe. This equipment shall be kept in serviceable condition and shall not be used for other purposes than fighting forest fires.

19g. From May 1 to November 1 of each year, steam loading engines shall be moved by locomotives, instead of by their own power so far as practicable. When it is impracticable to move such engines by locomotives, the Forest officer in charge may require that they shall be moved only under such precautions as he shall prescribe, which may include having all exhausts outside the stack and patrols, as he may require, or that none shall be so moved until an existing period of unusual fire danger has passed.

19h. Whenever during the period from April 1 to November 15 of each year the Forest officer in charge considers it necessary, the purchaser shall provide a watchman during the noon hour and during the night at each steam loading engine if said engines have had fire in the fire box during the preceding 12 hours.

19i. Two tank cars, each containing at least 5,000 gallons of water and each equipped with at least 1,000 feet of one and one-half (1½) inch fire hose with nozzle and a steam force pump with steam cylinders of at least 4½ inches diameter, water cylinders of at least 3 inches diameter and length of stroke at least 4 inches, or a gasoline force pump, which in the judgment of the Forest Supervisor is equally as satisfactory, shall be provided by the purchaser, shall be kept ready for immediate use in suppressing forest fires, and shall be placed, when not in use for fire fighting purposes, on a connected siding at a point designated by the Forest officer in charge.

19j. The purchaser shall maintain a supply of 15 long-handle, round-point shovels, 7 double-bitted axes, one five-gallon hand force pump and pack can, and 2 asphalt rakes at each camp used in logging the timber covered by this agreement. The said tools shall not be used for any purpose except fighting fires and shall be kept in serviceable condition.

The purchaser shall also furnish and maintain 4 suitable sealed boxes, each containing 7 shovels and 3 axes. These boxes shall be moved from place to place on the sale area in accordance with the directions of the Forest officer in charge so that fire fighting tools may be readily accessible to all woods workers.

19k. During the period from May 1 to November 1 of each year, the purchaser shall employ a fire warden, for whom a commission as State fire warden will be requested, and whose sole duties shall be the prevention and suppression of forest fires on the operation of the purchaser.

19l. During such periods of each year as may be designated in writing by the Forest Supervisor, the purchaser shall employ patrolmen in such numbers, but not to exceed four at any one time, as may be required by the Forest Supervisor. Such patrolmen shall patrol the areas in which fallers or other small groups of laborers are working, follow workers to and from camp or lunch grounds and cover any other points of danger, as may be required by the Forest officer in charge.

19m. During periods of exceptional emergency, created by hazardous climatic conditions or otherwise, the Forest Supervisor, or officer to whom he may have delegated authority for this

purpose, shall require such additional patrols or other emergency measures as he may determine to be necessary to meet the situation, which requirements, as far as practicable, shall be set forth in the fire plan for the sale area; and if, in the judgment of the Supervisor, other precautions are not adequate or if the operator shall not comply with the emergency measures required, the Supervisor or other authorized officer shall have authority to close down such machines or such portions of the logging operations as, in his judgment should be discontinued during the period of the emergency or until the emergency requirements are met by the operator.

19n. A fire protection plan, containing detailed instructions for fire prevention and suppression in connection with this operation, satisfactory to the Forest Supervisor, shall be prepared prior to the beginning of logging operations each season and placed in effect throughout the fire danger period as determined by the Forest officer in charge.

19o. Any sawmill operating within this sale area shall be operated by means of internal combustion engines. The mill site shall be cleared and kept clear of all inflammable material for a distance of at least one hundred feet in all directions from the mill. All sawdust and other mill refuse shall be burned currently in a burner satisfactory to the Forest officer in charge.

Occupancy and Improvements.—**20.** The purchaser is authorized to build, on National Forest land, sawmills, camps, railroads, roads, and other improvements necessary in the logging or the manufacturing of the timber included in this agreement: *Provided*, That all such structures and improvements shall be located and operated subject to such regulation by the Forest officer in charge as may be necessary for the protection of National Forest interests. The continuance or operation of such improvements on National Forest land after this agreement has terminated shall be subject to authorization by permit or easement under United States laws, and unless such authorization is secured all improvements not removed shall become the property of the United States at the expiration of six months from the termination of this agreement.

21. All merchantable timber used in the construction of buildings, roads, and other structures, necessary in connection with the cutting and removal of the timber covered by this agreement, shall be paid for at the current rates for such material under this agreement. Merchantable material of other species, cull material, and unmerchantable tops of any species may be used for such purposes without charge and shall be left in place where used.

22. The purchaser shall keep all logging camps, mills, stables, and other structures used in connection with this sale, and the ground in their vicinity, in a clean, sanitary condition, and rubbish shall be removed and burned or buried. When camps or other establishments are moved from one location to another or abandoned, the purchaser shall burn or otherwise effectively dispose of all débris and abandoned structures.

23. All telephone lines, ditches, and fences, located within or immediately outside the exterior boundaries of the sale area, shall be protected so far as possible in logging operations and, if injured, shall be repaired immediately by the purchaser, and the Forest Supervisor may, when in his judgment it is necessary, require the purchaser to move any such telephone line or fence from one location to another. Roads and trails shall at all times be kept free of logs, brush, and débris resulting from the purchaser's operations hereunder, and any road or trail used by the purchaser in connection with this sale that is damaged or injured beyond ordinary wear and tear through such use shall promptly be restored by him to its original condition.

23a. Wood taken from tops or unmerchantable timber for use as fuel in connection with logging operations shall be allowed free of charge.

Other Conditions.—**24.** The right to extract naval stores from any of the timber included in this sale is reserved to the United States. Naval stores rights may be leased by the United States during the contract period: PROVIDED, That operations under such leases or sales will not, in the judgment of the Forest officer in charge, interfere with logging operations conducted by the purchaser, and that any lease made by the United States will not permit the boxing of timber or the deterioration of the lumber value of the trees.

(Insert other conditions, if any are necessary)

(Insert pages when additional space is needed)

U. S. GOVERNMENT PRINTING OFFICE: 1927 8—4140

25. Section corners, quarter section corners, or meander posts on any Government line of survey shall not be destroyed, defaced, changed or removed to another place, nor shall any witness tree or any tree blazed to mark the line of a Government survey be cut down in the carrying out of the provisions of this contract. (See Sec. 57, Act March 4, 1909, 35 Stat. 1099).

26. The purchaser further agrees, as a consideration under this agreement, that he will not sell, pool or otherwise dispose of any products manufactured from the timber included in this sale in combination or cooperation with other manufacturers of similar products, or otherwise, by or thru methods of marketing such products or marketing organizations which are found by the Secretary of Agriculture to constitute a substantial control of the supply of such products sufficient in extent and of such a nature as to be injurious to the interests of the public; that upon such finding he will desist from such disposition of such products, and that failure so to desist shall constitute sufficient cause for the termination of this agreement: PROVIDED, That no finding will be made hereunder by the Secretary of Agriculture until the purchaser has had notice and an opportunity to be heard on the matters involved; AND PROVIDED FURTHER, That the agreement shall not be terminated hereunder in less than sixty days from the date of such finding.

27. Officers of the Forest Service, fire fighters and other regular and temporary employees shall be transported free of charge over logging railroads not common carriers operated in connection with this sale and shall be permitted to ride upon logging trains and engines or to operate speeders when travelling upon official business. Forest officers and other employees riding on logging trains, engines or speeders shall do so at their own risk, and the owner of the railroad expressly reserves the right to enter into an agreement with such persons before entering upon such trains or engines, or before operating a speeder, releasing the said owner from liability for any injury sustained by them in riding on said trains or engines, or speeders, arising from any cause whatsoever. In emergencies arising from forest fire, special trains shall be furnished to officers and employees of the Forest Service.

28. It is agreed that the operator will construct during the period of this agreement, a railroad, not necessarily a common carrier, between Alturas and a point near the northwest corner of T. 42 N., R. 9 E.

The purchaser hereby agrees as a part of the consideration of this agreement, to grant to the Forest Service or to such other parties as the Forest Service may designate, the privilege of using the above-described railroad for the purpose of, or in connection with, the logging of any National Forest timber tributary to this railroad but not included in this contract. The purchaser agrees to

negotiate freely and fairly for the privilege of transporting lumber or log freight over this line, with all parties who are designated by the Forest Service as bona fide prospective purchasers of stumpage, it being understood and agreed that all such operators will be required to regulate their use of the road in such a way as to create no unnecessary interference with the log or lumber traffic derived from the areas within this contract; to furnish the necessary rolling stock and motive power for transporting their own product, and in addition to pay a track rental which shall be based upon a fair proportion of depreciation, interest on investments, and maintenance involved in that portion of the railroad in question, and other reasonable items.

Any such arrangement as above outlined for the common use of the said railroad line, may be terminated at the date of expiration of this contract at the option of the purchaser.

PROVIDED, further, that in the event it is impossible for the aforesaid parties to agree upon a plan for the mutual use of aforesaid railroad, a board of appraisers of three persons, one to be named by the purchaser, one to be named by the bona fide prospective purchaser who would be affected by the use of such railroad line, and the third to be named by the two thus chosen, will fix the terms involving the joint use of the railroad. The Board of Arbitration above provided for shall meet upon the call of the District Forester and the majority vote shall be binding upon the Board.

29. It is agreed as a part of the consideration of this agreement that after July 1, 1933 the purchaser shall employ a sawmill of the band type in manufacturing this stumpage. It is further agreed that this sawmill shall be located within the boundaries of Modoc County, California.

PROVIDED, That failure to comply with this section shall be cause for cancellation of this agreement, but that the United States shall make no claim for damages as the result of such failure.

30. **Exchanges of Land for Timber.**—The purchaser, desiring to cooperate with the Department of Agriculture in carrying out the purposes of the act of Congress approved March 20, 1922 (42 Stat. 465), and other land exchange acts of like purpose, agrees that any portion of the timber covered by this agreement may, in the discretion of the Secretary of Agriculture, be granted to a third party in exchange for private lands conveyed to the United States under said acts where such party agrees to sell timber to said purchaser at the prices stipulated in this agreement or which may have been established in accordance with its terms; and further agrees that in such event he will purchase said timber from the party to whom granted at the price or prices per thousand board feet, or other unit of measurement stipulated in this agreement or which may have been established in accordance with its terms, and will cut and remove such timber and dispose of the slash therefrom in strict accordance with the requirements and provisions of this agreement; it being mutually understood and agreed that all timber so cut and removed shall be credited against the maximum or minimum periodic cuts prescribed by section 3 of this agreement. Payment for such timber shall be remitted to the district fiscal agent of the Forest Service, at San Francisco, California, upon notification by the Forest Supervisor and in amounts not exceeding the maximum established by section 2 of this agreement. If title to the conveyed land is finally accepted by the Secretary of the Interior the district fiscal agent will pay to the owner of said land the amount deposited to cover the value of the timber granted in lieu thereof, but if title to the conveyed land is not accepted by the Secretary of the Interior the district fiscal agent will credit the amount deposited to this timber sale as a payment. All privileges of selecting, cutting, and removing timber covered by this agreement, which by this section are conceded to third parties, shall be equally available to the purchaser under the terms and conditions set forth herein, except that prior deposit of the value of the selected timber shall not be required in cases where the purchaser is also the owner of the conveyed land unless the purchaser desires to cut and remove the selected stumpage before title to the conveyed land is finally accepted by the Secretary of the Interior, in which event the value of the timber to be cut must be deposited as in the case of third parties but will be refunded or applied as a timber sale payment if and when the exchange is consummated by acceptance of the offered land.

U. S. GOVERNMENT PRINTING OFFICE: 1927 8—4140

(In the following sections, continue the numbering serially from the last number used on the preceeding page)

31. At all times when logging operations are in progress the purchaser shall have at the main camp for his employees working on the sale area, a representative who shall be authorized to receive, on behalf of the purchaser, any or all notices and instructions in regard to work under this agreement given by the Forest officer in charge, and to take such action thereon as is required by the terms of this agreement.

32. Complaints by the purchaser as to any action taken by a Forest officer respecting this agreement shall not be considered unless made in writing within thirty (30) days of such action to the Forest Supervisor having jurisdiction. The decision of the Secretary of Agriculture shall be final in the interpretation of the regulations and provisions governing the sale, cutting, and removal of the timber covered by this agreement.

33. All operations on the sale area, including the removal of scaled timber, may be suspended by the Forest officer in charge, in writing, if the conditions and requirements contained in this agreement are disregarded, and failure to comply with any one of said conditions and requirements, if persisted in, shall be sufficient cause for the termination of this agreement: *Provided*, That the Forester may, upon reconsideration of the conditions existing at the date of sale and in accordance with which the terms of this agreement were fixed, and with the consent of the purchaser, terminate this agreement, but in the event of such termination the purchaser shall be liable for any damages sustained by the United States arising from the purchaser's operations thereunder.

34. All the records pertaining to the purchaser's logging operation and milling business shall be open to inspection at any time by a Forest officer authorized by the District Forester to make such inspection, with the understanding that the information obtained shall be regarded as confidential.

35. The term "officer in charge," wherever used in this agreement, signifies the officer of the Forest Service who shall be designated by the proper Supervisor to supervise the timber operations in this sale.

36. No Member of or Delegate to Congress, or Resident Commissioner, after his election or appointment, and either before or after he has qualified, and during his continuance in office, shall be admitted to any share or part of this contract or agreement, or to any benefit to arise thereupon. Nothing, however, herein contained shall be construed to extend to any incorporated company, where such contract or agreement is made for the general benefit of such incorporation or company. (Section 3741, Revised Statutes, and Sections 114–116, act of March 4, 1909.)

37. This agreement shall not be assigned in whole or in part.

38. The conditions of the sale are completely set forth in this agreement, and none of its terms can be varied or modified except in writing by the Forest officer approving the agreement or his successor or superior officer, and in accordance with the regulations of the Secretary of Agriculture. No other Forest officer has been or will be given authority for this purpose.

39. And as a further guarantee of a faithful performance of the conditions of this agreement,[1] the purchaser delivers herewith

a bond in the sum of Ten Thousand Dollars ($ 10,000.00), and further agrees that all moneys paid under this agreement shall, upon failure on his part to fulfill all and singular the conditions and requirements herein set forth, or made a part hereof, be retained by the United States to be applied as far as may to the satisfaction of his obligations assumed hereunder. The purchaser further agrees that should the sureties on the bond delivered herewith or on any bond delivered hereafter in connection with this sale become unsatisfactory to the officer approving this agreement, the purchaser will, within thirty days of receipt of demand, furnish a new bond with sureties solvent and satisfactory to the approving officer.

Signed in duplicate this _____ day of _____, 192

(Same date as bond)

Witnesses:[2] (Corporate seal, if corporation)

_____ _____
(Signature of purchaser) (See note)

_____ _____
(Signature of purchaser)

_____
(Title)

Approved at _____, under the above conditions, _____, 192

_____
(Signature of approving officer)

_____
(Title)

[1] If no bond is required, cross out the second line and the second sentence of the last paragraph.
[2] Signature of two witnesses required if sale is over $100.

If contracting party is a copartnership, form of signature should be { X Y Z Company, By John Doe, *A Member of Firm.*

If contracting party is a corporation, form of signature should be { X Y Z Company, By John Doe, *President (or other officer or agent)*, and the seal of the corporation must be impressed as indicated.

U. S. GOVERNMENT PRINTING OFFICE: 1927 8—4140

PENALTY FOR PRIVATE USE TO AVOID
PAYMENT OF POSTAGE, $300.

OFFICIAL BUSINESS

LAVA BEDS NAT'L MONUMENT

T.45N. T.44N. T.43N. T.42N. T.41N. T.40N.

R.4E. R.5E. R.6E. R.7E. R.8E. R.9E.

Spr. Straw Spr. Spr. Spr. Timber Mt. Glass Flow Glass Mt. Red Top Juniper & Sage Manzanita or Black Mt. Fir Brush Burnt Lava Buck Butte Ouaking Asp Edge of Lava Water Hole Lava Lake Water Holes Round Mt. Lookout Water Holes Lava R.S. Sugar Pine Ridge Scattering Yellow Pine Brush and Lava Rock Webb Butte Mud Spr. Hollenbeck Flat Mud Lake Edge of Lava Lava Reefs Lava Reefs Lava Reefs

N.B. This work is part of Berry & Hughes appraisal report on Badger Springs Unit and is to be filed in envelope at back of appraisal report

BLK

LAVA BEDS NAT'L MONUMENT

T.45N. T.44N. T.43N. T.42N. T.41N. T.40N.

R.4E. R.5E. R.6E. R.7E. R.8E. R.9E.

Spr. Straw Timber Mt. Glass Mt. Red Top Manzanita or Black Mt. Fir Brush Burnt Lava Flow Buck Butte Edge of Lava Beds Juniper & Sage Scott Timber Shasta Forest Modoc Co. Modoc Nat'l Forest Quaking Asp Hollenbeck Flat Water Hole Lava Lake Lava Reefs Mud Spr. Mud Lake Edge Spr. Lone Pine Butte Mowitz Butte Badger Spring and Well Browns Well Deer Hill Jacquima Res. Deer Hill R.S. Rock Hog Lake Scottylings Res. Beeler Res. Duncan Res. Blacks Canyon Zurlier Cr. Happy Camp R.S. Happy Camp Mt. Lookout Webb Butte Webb Flat Sugar Pine Ridge Crank Butte Crank Spr. Westlake Butte Westlake Gl. Bit River R.S. Rim Bit River Schaffer Mt. Scattering Yellow Pine Brush and Lava Rock Round Mt. Lookout Water Holes Lava R.S. Mosquito Barnum Flat Mayfield Road White Horse Res. Taylor Mt. Kramer R.S. Roberts Res. Splawn Mt. School Hines Gould Criss Pit Donica Whorl Lake Williams Reservoir Marsh Valley Swamp

BADGER SPRINGS UNIT - MODOC NATIONAL FOREST

To accompany appraisal report, June 1928.
Map prepared by B.O.Hughes, June 1928.

J.R. Berry

LEGEND:

- Boundary of Unit,
- Boundary of heavy insect infestation,
- Tally Strips,
- Approximate mill locations,
- Long Bell Lumber Company ownership,
- Pickering " " "
- Red River " " "
- Miscellaneous ownership.